

CHAPTER 2

DESCRIPTION OF THE LITTLE TENNESSEE RIVER WATERSHED

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2.1. BACKGROUND. The Little Tennessee River is part of the TVA system of rivers and lakes. In Tennessee, the waterway is now called Tellico and Chilhowee Reservoirs. The watershed was home to the village of Itsa' sa, or Echota (also spelled Chota), which was regarded as the capital of the Cherokee nation. Headwaters are in both Tennessee and North Carolina, and public lands in Tennessee include the Great Smoky Mountains National Park and Cherokee National Forest.

This Chapter describes the location and characteristics of the Tennessee portion of the Little Tennessee River Watershed.

2.2. DESCRIPTION OF THE WATERSHED.

2.2.A. General Location. The Little Tennessee River Watershed is located in Tennessee and North Carolina. The Tennessee portion (74.5% of the watershed) includes parts of Blount, Loudon, and Monroe Counties.

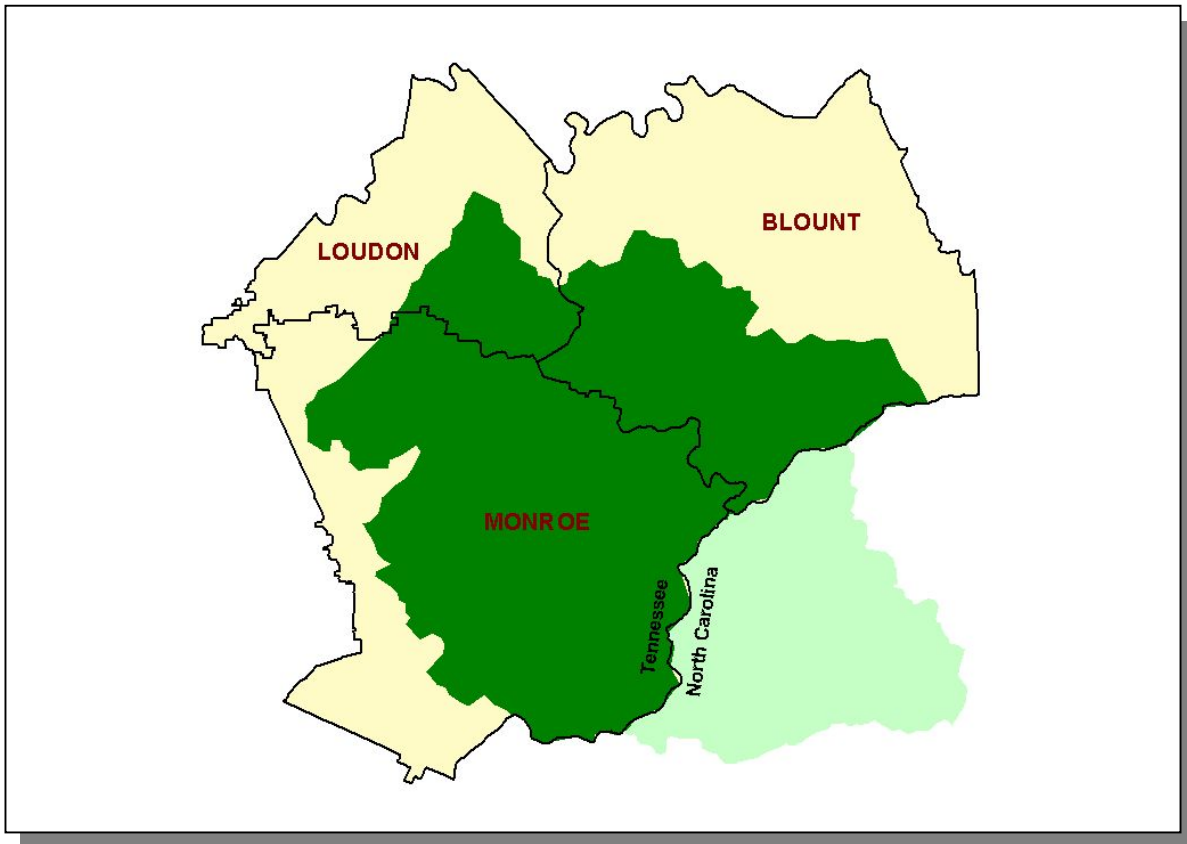


Figure 2-1. General Location of the Little Tennessee River Watershed. Dark green, Tennessee portion (783 square miles); light green, North Carolina portion (267 square miles).

COUNTY	% OF WATERSHED IN EACH COUNTY
Monroe	62.8
Blount	28.2
Loudon	8.9

Table 2-1. The Little Tennessee River Watershed Includes Parts of Three East Tennessee Counties. Percentages are calculated for Tennessee portion of watershed.

2.2.B. Population Density Centers. Four state highways serve the major communities in the Tennessee portion of the Little Tennessee River Watershed.



Figure 2-2. Municipalities and Roads in the Tennessee Portion of the Little Tennessee River Watershed.

MUNICIPALITY	POPULATION	COUNTY
Madisonville*	3,635	Monroe
Vonore	938	Monroe
Tellico Plains	758	Monroe
Greenback	684	Loudon

Table 2-2. Communities and Populations in the Tennessee Portion of the Little Tennessee River Watershed. Population based on 1999 census (Tennessee 2001/2002 Blue Book). Asterisk (*) indicates county seat.

2.3. GENERAL HYDROLOGIC DESCRIPTION.

2.3.A. Hydrology. The Little Tennessee River Watershed, designated 06010204 by the USGS, drains approximately 1,050 square miles, 783 square miles of which are in Tennessee, and empties to the Fort Loudoun Lake Watershed (06010201).

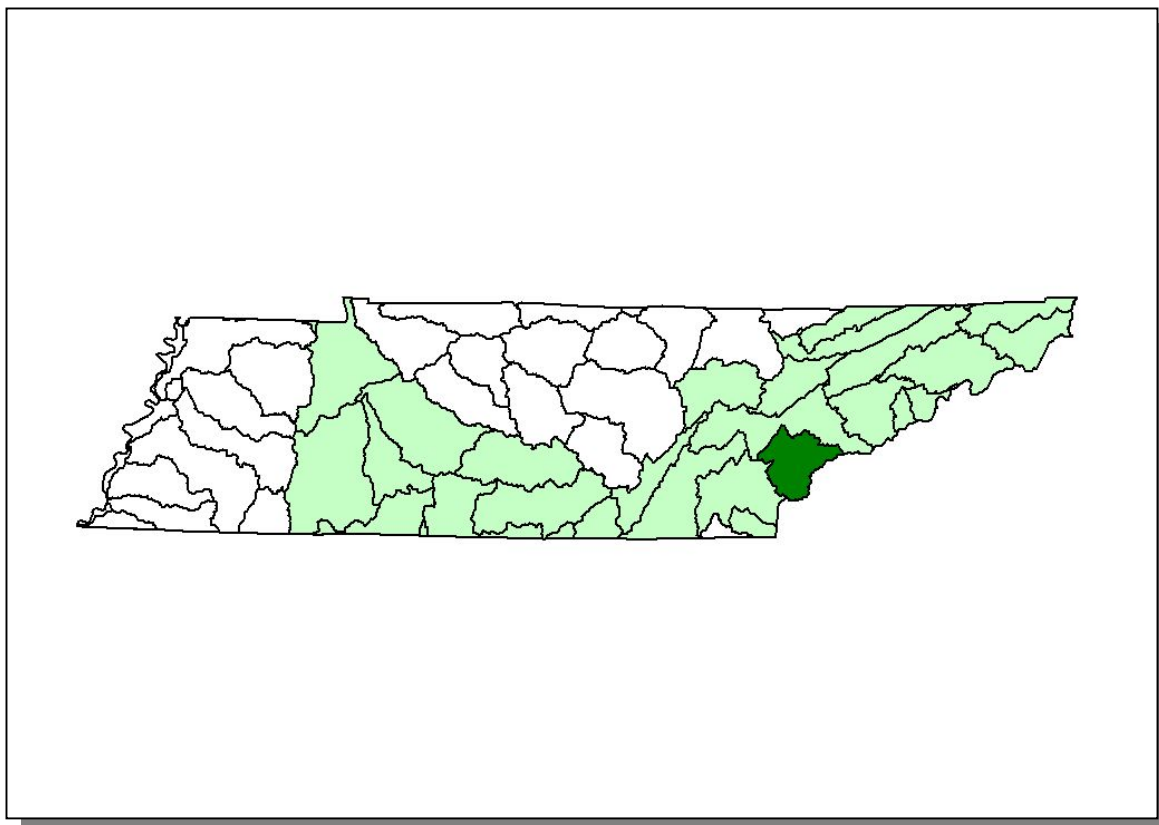


Figure 2-3. The Little Tennessee River Watershed is Part of the Tennessee River Basin.

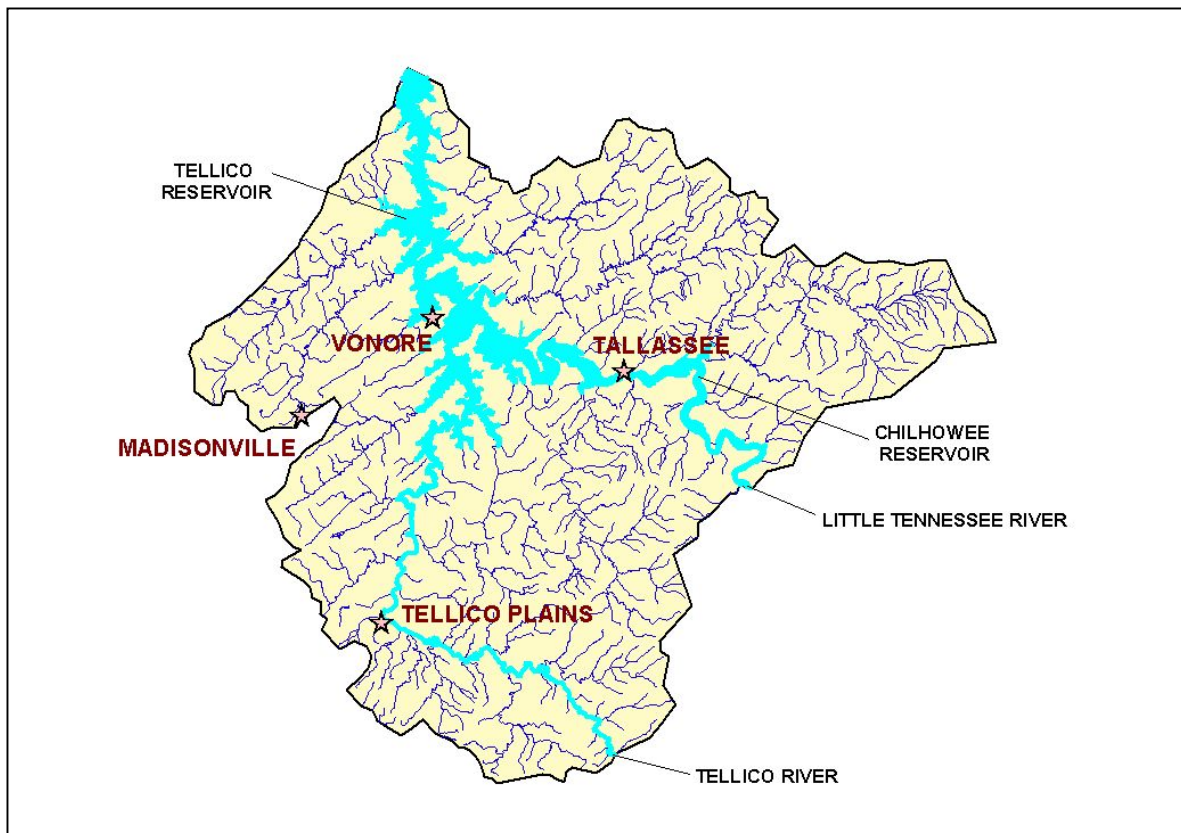


Figure 2-4. Hydrology in the Tennessee Portion of the Little Tennessee River Watershed. There are 1,082 stream miles and 18,878 lake acres in the Tennessee portion of the Little Tennessee River Watershed as catalogued in the assessment database. An additional 415 stream miles are located in the North Carolina portion of the watershed as catalogued in the River Reach File 3 database. Location of the Little Tennessee River, Tellico River, and the cities of Madisonville, Tallassee, Tellico Plains, and Vonore are shown for reference.

2.3.B. Dams. There are 10 dams inventoried by TDEC Division of Water Supply in the Tennessee portion of the Little Tennessee River Watershed. These dams either retain 30 acre-feet of water or have structures at least 20 feet high.

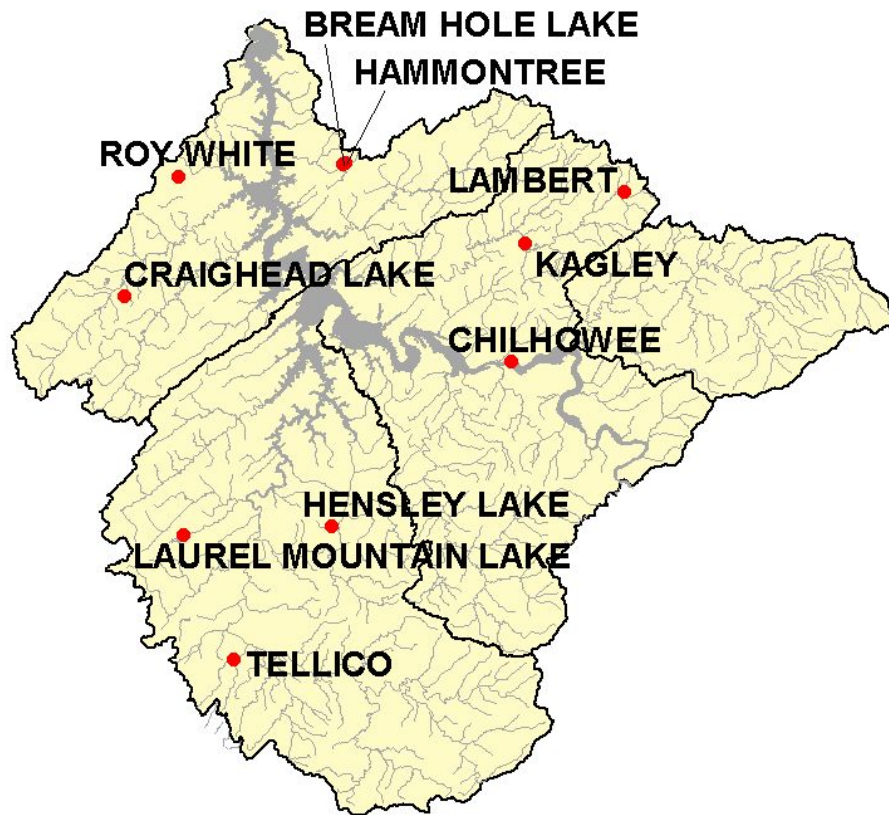


Figure 2-5. Location of Inventoried Dams in the Tennessee Portion of the Little Tennessee River Watershed. More information is provided in Appendix II and on the TDEC homepage at <http://gwidc.memphis.edu/website/dws/>.

2.4. LAND USE. Land Use/Land Cover information was provided by EPA Region 4 and was interpreted from 1992 Multi-Resolution Land Cover (MRLC) satellite imagery.

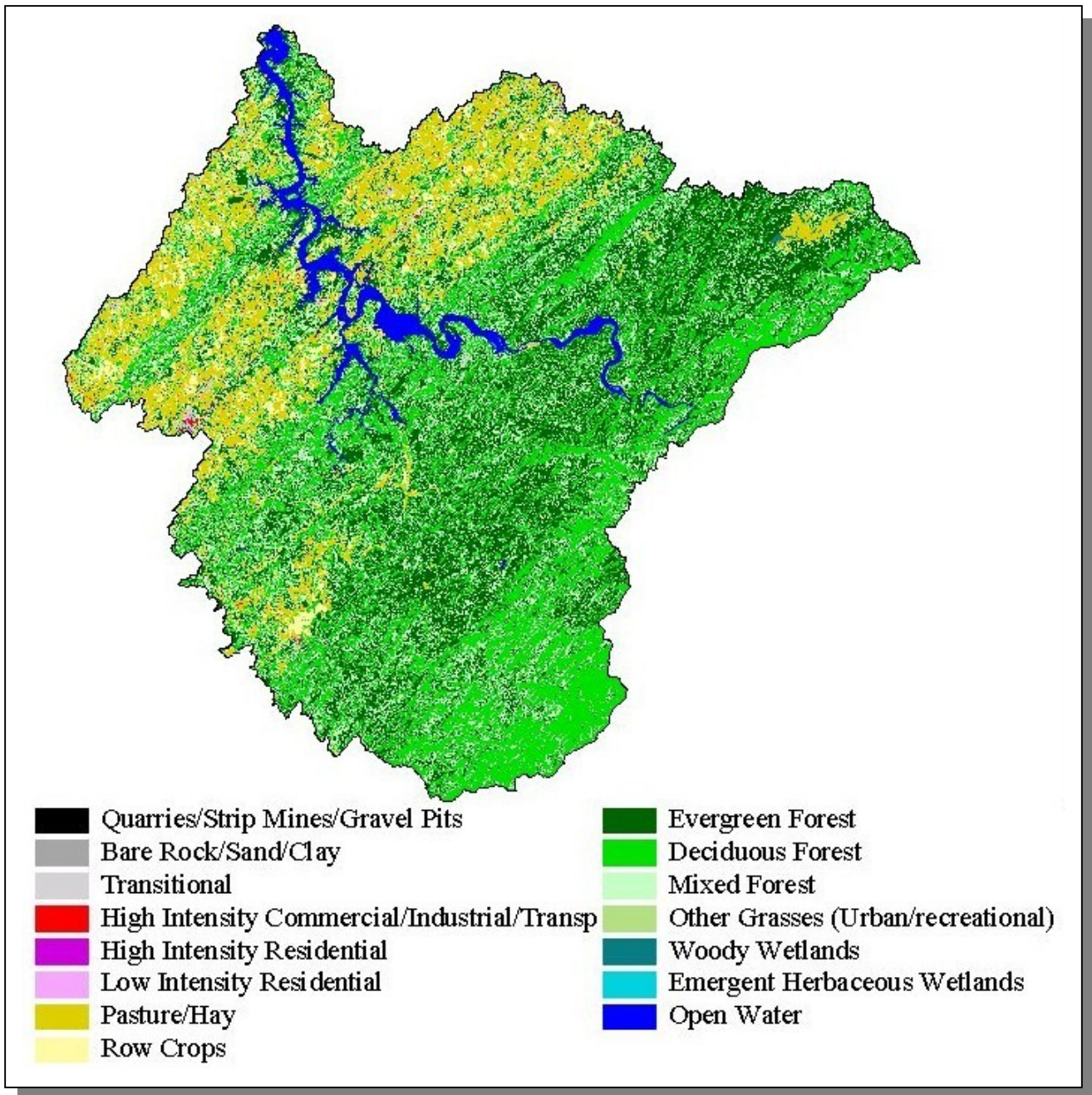


Figure 2-6. Illustration of Select Land Cover/Land Use Data from MRLC Satellite Imagery in the Tennessee Portion of the Little Tennessee River Watershed.

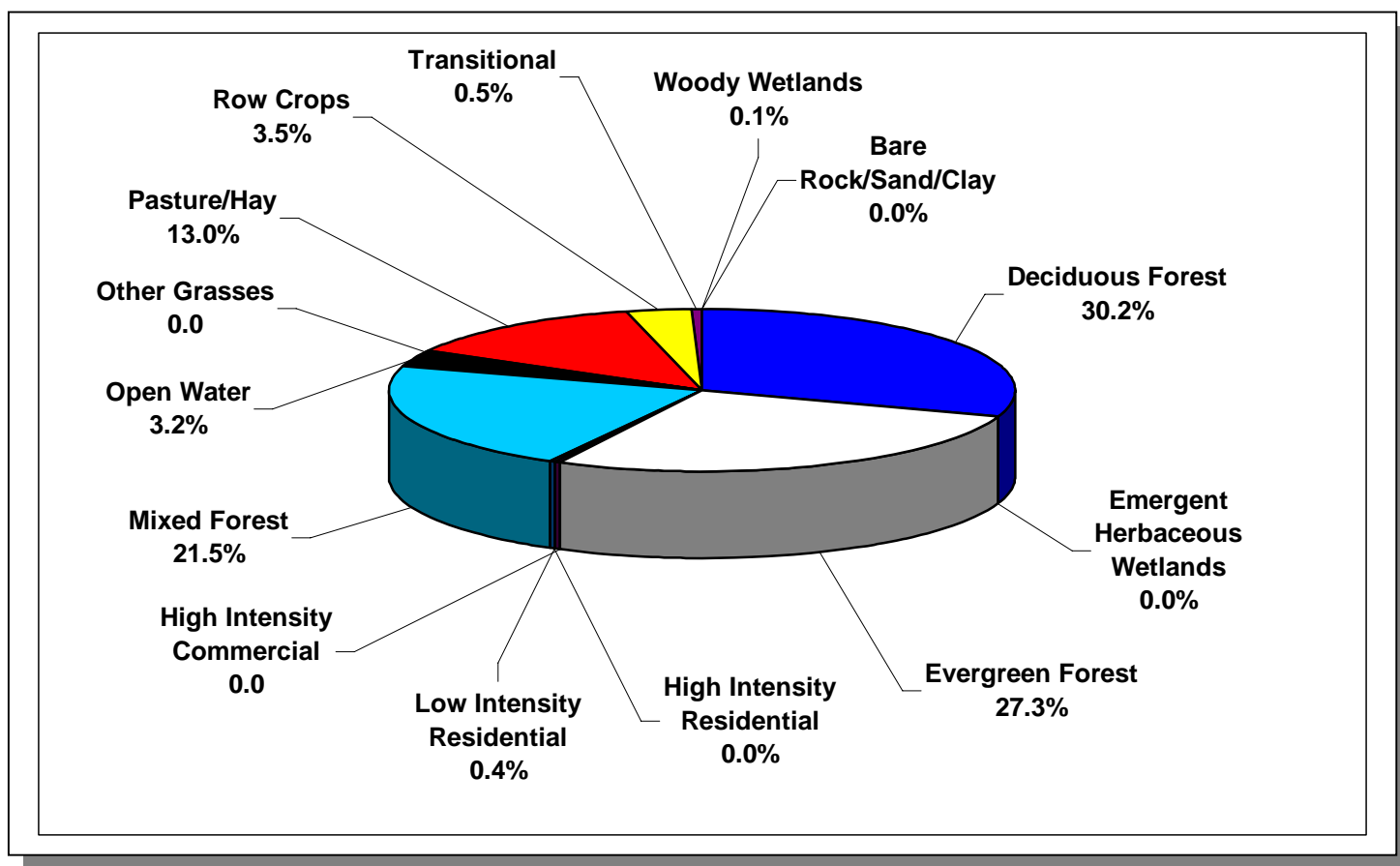


Figure 2-7. Land Use Distribution in the Tennessee Portion of the Little Tennessee River Watershed. More information is provided in Appendix II.

Sinkholes, springs, disappearing streams and caves characterize karst topography. The term “karst” describes a distinctive landform that indicates dissolution of underlying soluble rocks by surface water or ground water. Although commonly associated with limestone and dolomite (carbonate rocks), other highly soluble rocks such as gypsum and rock salt can be sculpted into karst terrain. In karst areas, the ground water flows through solution-enlarged channels, bedding planes and microfractures within the rock. The characteristic landforms of karst regions are: closed depressions of various size and arrangement; disrupted surface drainage; and caves and underground drainage systems. The term “karst” is named after a famous region in the former country of Yugoslavia.

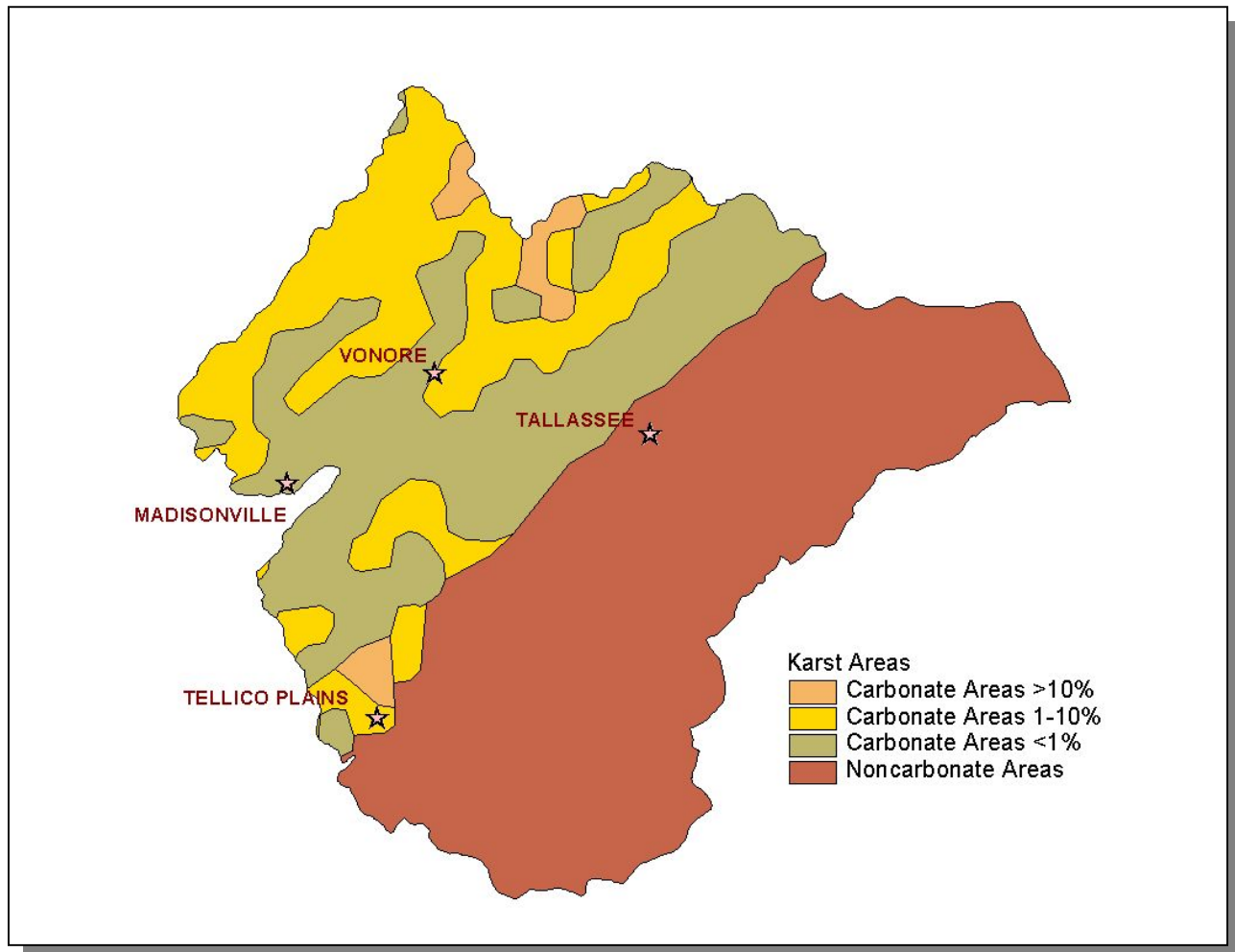


Figure 2-8. Illustration of Karst Areas in Tennessee Portion of Little Tennessee River Watershed. Locations of Madisonville, Tallassee, Tellico Plains, and Vonore are shown for reference.

2.5. ECOREGIONS AND REFERENCE STREAMS. Ecoregions are relatively homogeneous areas of similar geography, topography, climate and soils that support similar plant and animal life. Ecoregions serve as a spatial framework for the assessment, management, and monitoring of ecosystems and ecosystem components. Ecoregion studies can aid the selection of regional stream reference sites, identifying high quality waters, and developing ecoregion-specific chemical and biological water quality criteria.

There are eight Level III Ecoregions and twenty-five Level IV subcoregions in Tennessee. The Tennessee portion of the Little Tennessee River Watershed lies within 2 Level III ecoregions (Blue Ridge Mountains and Ridge and Valley) and contains 7 Level IV subcoregions:

- **Southern Sedimentary Ridges (66e)** include some of the westernmost foothill areas of the Blue Ridge Mountains ecoregion, such as Bean, Starr, Chilhowee, English, Stone, Bald, and Iron Mountains. Slopes are steep with elevations of 1000-4500 feet. Rocks are primarily Cambrian-age sedimentary (shale, sandstone, siltstone, quartzite, conglomerate), although some lower stream reaches occur on limestone. Soils are predominantly friable loams and fine sandy loams with variable amounts of sandstone rock fragments. Natural vegetation is mostly mixed oak and oak-pine forests.
- **Limestone Valleys and Coves (66f)** are small but distinct lowland areas of the Blue Ridge, with elevations mostly between 1500 and 2500 feet. About 450 million years ago, older Blue Ridge rocks to the east were forced up and over younger rocks to the west. In places, the Precambrian rocks have eroded through to Cambrian or Ordovician-age limestones, as seen especially in isolated, deep cove areas that are surrounded by steep mountains. The main areas of limestone include the Mountain City lowland area and Shady Valley in the north; and Wear Cove, Tuckaleechee Cove, and Cades Cove of the Great Smoky Mountains in the south. Hay and pasture, with some tobacco patches on small farms, are typical land uses.
- **Southern Metasedimentary Mountains (66g)** are steep, dissected, biologically-diverse mountains that include Clingmans Dome (6643 feet), the highest point in Tennessee. The Precambrian-age metamorphic and sedimentary geologic materials are generally older and more metamorphosed than the Southern Sedimentary Ridges (66e) to the west and north. The Appalachian oak forests and, at higher elevation, the northern hardwoods include a variety of oaks and pines, as well as silverbell, hemlock, yellow poplar, basswood, buckeye, yellow birch, and beech. The native spruce-fir forest, found generally above 5500 feet, has been affected greatly over the past twenty-five years by the great woolly aphid. The Copper Basin, in the southeast corner of Tennessee, was the site of copper mining and smelting from the 1850's to 1987, and once left more than fifty square miles of eroded bare earth.

- **Southern Limestone/Dolomite Valleys and Low Rolling Hills (67f)** form a heterogeneous region composed predominantly of limestone and cherty dolomite. Landforms are mostly low rolling ridges and valleys, and the soils vary in their productivity. Landcover includes intensive agriculture, urban and industrial uses, as well as areas of thick forest. White oak forest, bottomland oak forest, and sycamore-ash-elm riparian forests are the common forest types. Grassland barrens intermixed with cedar-pine glades also occur here.
- **Southern Shale Valleys (67g)** consist of lowlands, rolling valleys, slopes and hilly areas that are dominated by shale materials. The northern areas are associated with Ordovician-age calcareous shale, and the well-drained soils are often slightly acid to neutral. In the south, the shale valleys are associated with Cambrian-age shales that contain some narrow bands of limestone, but the soils tend to be strongly acid. Small farms and rural residences subdivide the land. The steeper slopes are used for pasture or have reverted to brush and forested land, while small fields of hay, corn, tobacco, and garden crops are grown on the foot slopes and bottom land.
- **Southern Sandstone Ridges (67h)** encompass the major sandstone ridges with areas of shale and siltstone. The steep, forested ridges have narrow crests with soils that are typically stony, sandy, and of low fertility. The chemistry of streams flowing down the ridges can vary greatly depending on the geological material. The higher elevation ridges are in the north, including Wallen Ridge and Powell, Clinch and Bays Mountains. White Oak Mountain in the south has some sandstone on the west side, with abundant shale and limestone. Grindstone Mountain, capped by the Gizzard Group sandstone, is the only remnant of Pennsylvanian-age strata in the ridge and valley of Tennessee.
- **Southern Dissected Ridges and Knobs (67i)** contain crenulated, broken, or hummocky ridges. The ridges on the east side of Tennessee's Ridge and Valley tend to be associated with the Ordovician Sevier shale, Athens shale, and Holston and Lenoir limestones. These can include calcareous shale, limestone, siltstone, sandstone, and conglomerate. In the central and western part the shale ridges are associated with the Cambrian-age Rome Formation: shale and siltstone with beds of sandstone. Chestnut oak forests and pine forests are typical for the higher elevations of the ridges, with white oak, mixed mesophytic forest, and tulip poplar on the lower slopes, knobs, and draws.

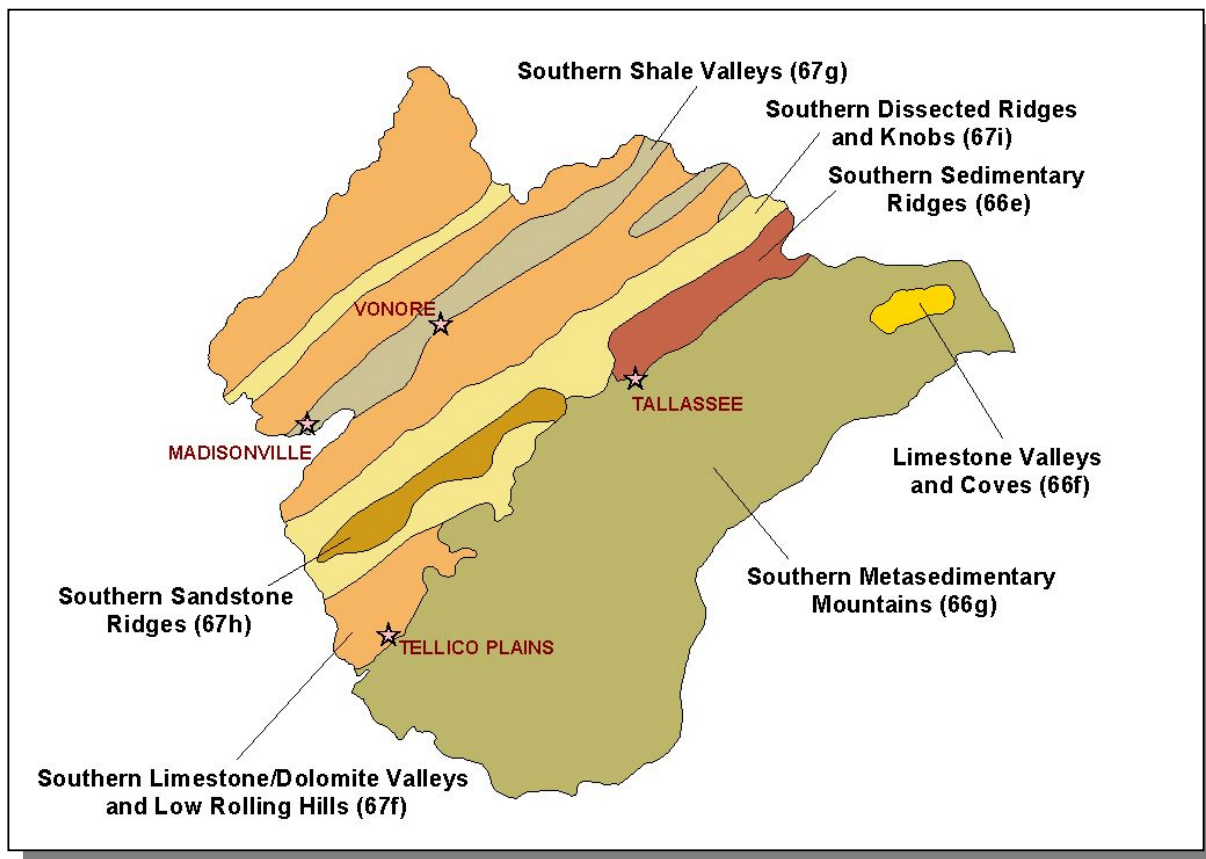


Figure 2-9. Level IV Ecoregions in the Tennessee Portion of the Little Tennessee River Watershed. Locations of Madisonville, Tallassee, Tellico Plains, and Vonore are shown for reference.

Each Level IV Ecoregion has at least one reference stream associated with it. A reference stream represents a least impacted condition and may not be representative of a pristine condition.

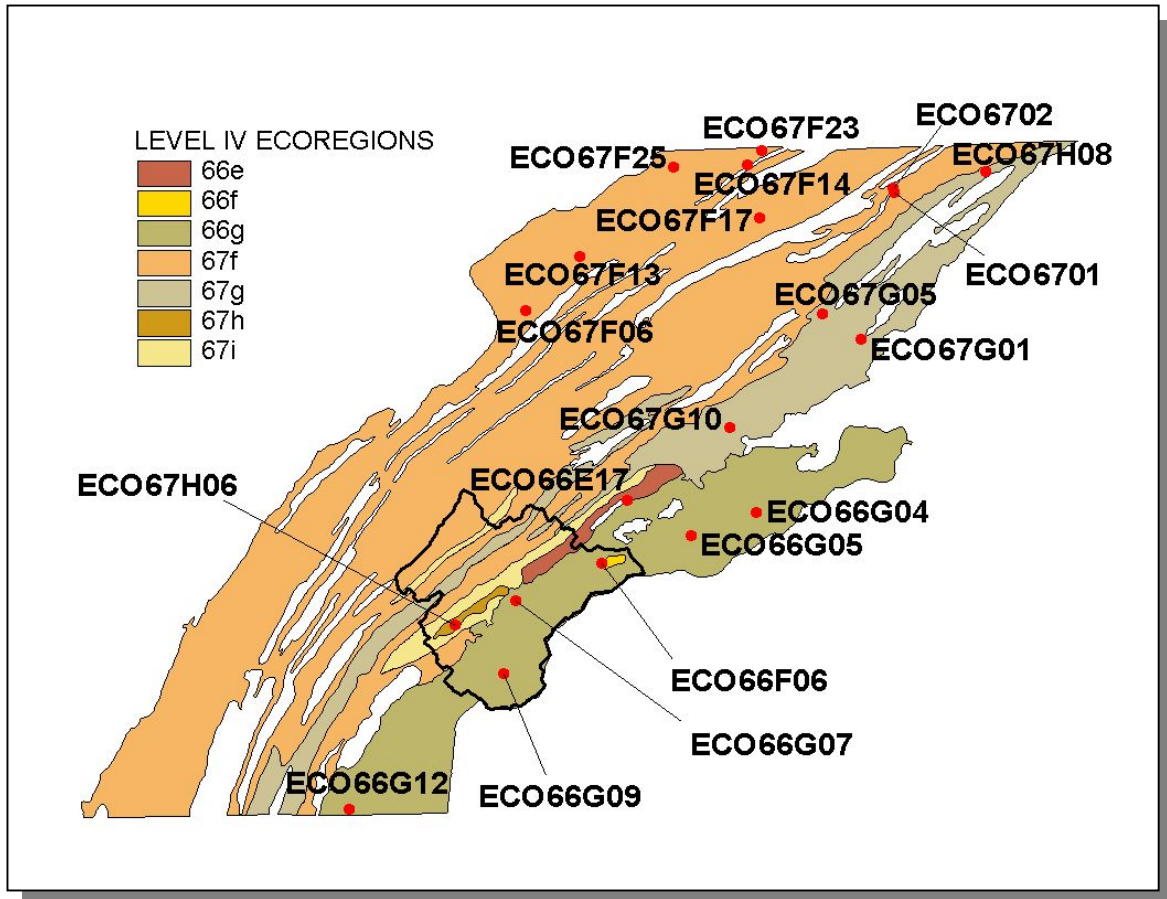


Figure 2-10. Ecoregion Monitoring Sites in Level IV Ecoregions 66e, 66f, 66g, 67f, 67g, 67h, and 67i in Tennessee. The Tennessee portion of the Little Tennessee River Watershed boundary is shown for reference. More information is provided in Appendix II.

2.6. NATURAL RESOURCES.

2.6.A. Rare Plants and Animals. The Heritage Program in the TDEC Division of Natural Heritage maintains a database of rare species that is shared by partners at The Nature Conservancy, Tennessee Wildlife Resources Agency, the US Fish and Wildlife Service, and the Tennessee Valley Authority. The information is used to: 1) track the occurrence of rare species in order to accomplish the goals of site conservation planning and protection of biological diversity, 2) identify the need for, and status of, recovery plans, and 3) conduct environmental reviews in compliance with the federal Endangered Species Act.

GROUPING	NUMBER OF RARE SPECIES
Insects and Spiders	3
Mussels	2
Snails	9
Other Invertebrates	3
Amphibians	4
Birds	8
Fish	12
Mammals	13
Reptiles	3
Plants	73
Total	130

Table 2-3. There are 130 Known Rare Plant and Animal Species in the Tennessee Portion of the Little Tennessee River Watershed.

In the Tennessee Portion of the Little Tennessee River Watershed, there are 13 rare fish species, 3 rare mussel species, and 11 rare snail species.

SCIENTIFIC NAME	COMMON NAME	FEDERAL STATUS	STATE STATUS
<i>Clinostomus funduloises ssp 1</i>	Smoky Dace		D
<i>Cycleptus elongates</i>	Blue Sucker	MC	T
<i>Cyprinella monacha</i>	Spotfin Chub	LT	T
<i>Etheostoma blennioides gutselli</i>	Tuckasegee Darter		E
<i>Etheostoma percnurum</i>	Duskytail Darter	LE	E
<i>Hemitrema flammea</i>	Flame Chub	MC	D
<i>Noturus baileyi</i>	Smoky Madtom	LE	E
<i>Noturus flavipinnis</i>	Yellowfin Madtom	LT, XN	E
<i>Percina aurantica</i>	Tangerine Darter	LE	E
<i>Percina burtoni</i>	Blotchside Darter	MC	D
<i>Percina tanasi</i>	Snail Darter	LT	T
<i>Phoxinus tennesseensis</i>	Tennessee Dace		D
<i>Quadrula intermedia</i>	Cumberland Monkeyface	LE	E
<i>Quadrula sparsa</i>	Appalachia Monkeyface	LE	E
<i>Athearnia anthonyi</i>	Anthony's Riversnail	LE	E
<i>Glyphyalina pentadelphia</i>	Pink Glyph		
<i>Helicodiscus fimbriatus</i>	Fringed Coil		
<i>Mesodon christyi</i>	Glossy Covert		
<i>Mesodon wheatleyi</i>	Cinnamon Covert		
<i>Paravitrea lamellidens</i>	Lamellate Supercoil		
<i>Stenotrema fraterum montanum</i>	A Pillsnail		
<i>Striatura exigua</i>	Ribbed Striate		
<i>Vertigo clappi</i>	Cupped Vertigo		

Table 2-4. Rare Aquatic Species in the Tennessee Portion of the Little Tennessee River Watershed. Federal Status: LE, Listed Endangered by the U.S. Fish and Wildlife Service; LT, Listed Threatened by the U.S. Fish and Wildlife Service; MC, Management Concern for U.S. Fish and Wildlife Service; XN, Non-Essential Experimental Population. State Status: E, Listed Endangered by the Tennessee Wildlife Resources Agency; T, Listed Threatened by the Tennessee Wildlife Resources Agency. More information may be found at <http://www.state.tn.us/environment/nh/data.php>.

2.6.B. Wetlands. The Division of Natural Heritage maintains a database of wetland records in Tennessee. These records are a compilation of field data from wetland sites inventoried by various state and federal agencies. Maintaining this database is part of Tennessee's Wetland Strategy, which is described at: <http://www.state.tn.us/environment/nh/wetlands/>

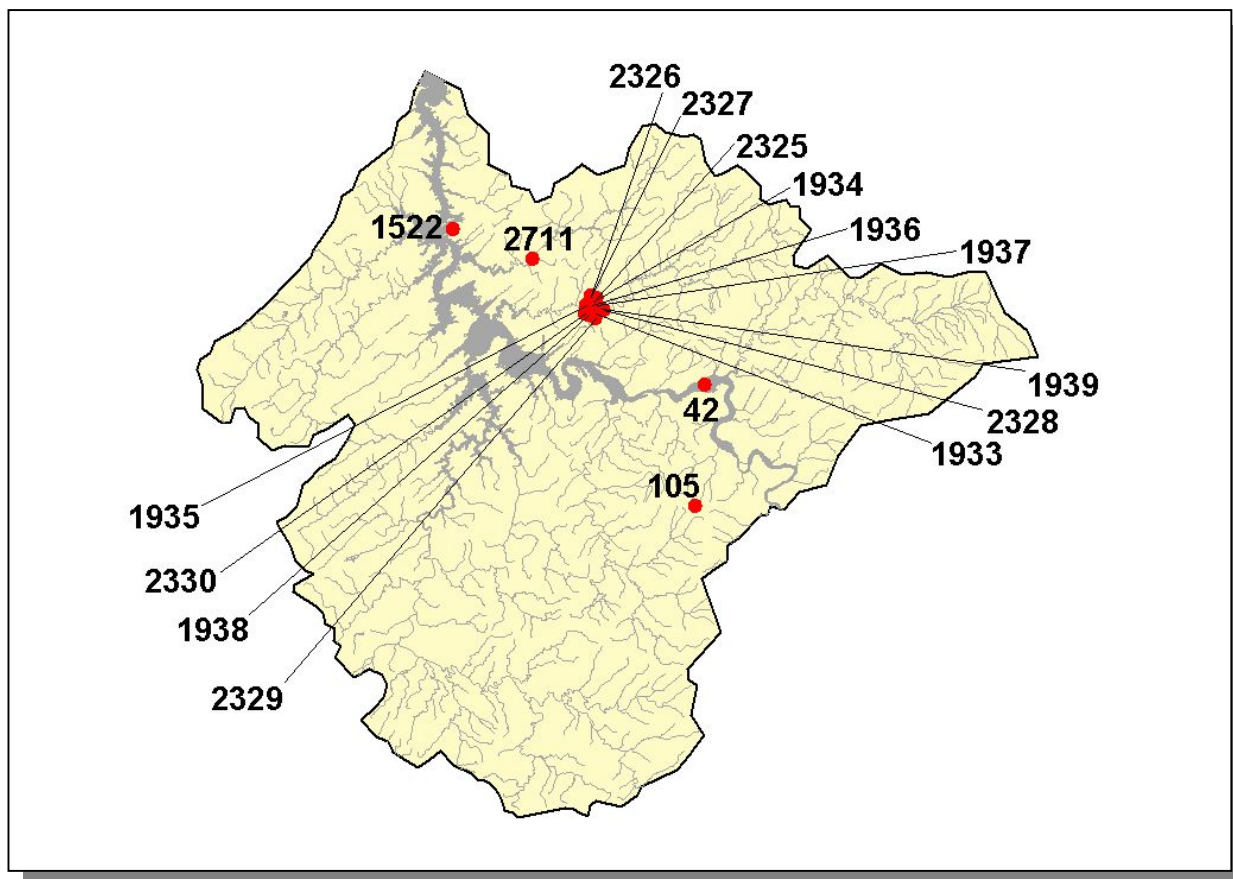


Figure 2-11. Location of Wetland Sites in TDEC Division of Natural Heritage Database in the Tennessee Portion of the Little Tennessee River Watershed. This map represents an incomplete inventory and should not be considered a dependable indicator of the presence of wetlands. More information is provided in Appendix II.

2.7. CULTURAL RESOURCES.

2.7.A. Nationwide Rivers Inventory. The Nationwide Rivers Inventory, required under the Federal Wild and Scenic Rivers Act of 1968, is a listing of free-flowing rivers that are believed to possess one or more outstanding natural or cultural values. Exceptional scenery, fishing or boating, unusual geologic formations, rare plant and animal life, cultural or historic artifacts that are judged to be of more than local or regional significance are the values that qualify a river segment for listing. The Tennessee Department of Environment and Conservation and the Rivers and Trails Conservation Assistance branch of the National Park Service jointly compile the Nationwide Rivers Inventory from time to time (most recently in 1997). Under a 1980 directive from the President's Council on Environmental Quality, all Federal agencies must seek to avoid or mitigate actions that would have an adverse effect on Nationwide Rivers Inventory segments.

The most recent version of the Nationwide Rivers Inventory lists portions of six streams in the Tennessee portion of the Little Tennessee River Watershed:

Abrams Creek, a small scenic stream, entirely within the Great Smoky Mountains National Park. Deer and fur-bearers common. Near the National Park Service campground.

Anthony Creek, a small scenic stream, entirely within the Great Smoky Mountains National Park. Deer and fur-bearers common. Near the National Park Service campground.

Little Pigeon River, a scenic, sparkling, excellent whitewater stream with waterfalls. Trout habitat.

Little Tennessee River (Segment 1), an excellent fishing and float stream. Critical habitat for snail darter. Historical significance, with 180 recorded archaeological sites. Unique scenery.

Little Tennessee River (Segment 2), an excellent fishing and float stream. Critical habitat for snail darter.

Middle Prong Little Pigeon River, a scenic, sparkling, excellent whitewater stream with waterfalls. Trout habitat.

Tellico River (Segment 1), a wild whitewater mountain stream with spectacular waterfalls and numerous recreational opportunities.

Tellico River (Segment 2), a whitewater mountain river with spectacular waterfalls and numerous recreational opportunities.

West Prong Little Pigeon River, a scenic, clear mountain stream with considerable recreation potential.

RIVER	SCENIC	RECREATION	GEOLOGIC	FISH	WILDLIFE	HISTORIC	CULTURAL
Abrams Creek	X	X	X		X		
Anthony Creek	X	X	X		X		
Little Pigeon River	X	X	X	X	X	X	X
Little Tennessee River (Segment 1)	X	X	X	X	X	X	X
Little Tennessee River (Segment 2)		X			X		
Middle Prong Little Pigeon River	X	X	X	X	X	X	X
Tellico River (Segment 1)	X	X	X	X	X	X	X
Tellico River (Segment 2)	X	X					
West Prong Little Pigeon River	X	X	X	X	X	X	X

Table 2-5. Attributes of Streams Listed in the Nationwide Rivers Inventory.

Additional information may be found online at:

<http://www.nps.gov/ncrc/programs/rtca/nri/index.html>

2.7.B. Greenways. The Little Tennessee River Watershed has at least three greenways/trails:

- Kefauver Walking Trail in Madisonville
- Tellico Walking Trail in Tellico Plains
- Bobby Brewer Memorial Trail in Fort Loudoun State Historic Area

More information about greenways and trails in the watershed may be found at:

<http://www2.state.tn.us/tdec/GREENWAYS/tnmap.htm>

2.7.C. Interpretive Areas. Some sites representative of the natural or cultural heritage are under state or federal protection:

- Cherokee National Forest, a 640,000-acre forest, is the largest tract of public land in Tennessee. The Forest is managed by the U.S. Forest Service and by the Tennessee Wildlife Resources Agency.
- Foothills Parkway, a scenic parkway authorized by Congress in 1944, was built along the western and northern perimeters to provide scenic views of the Great Smoky Mountains National Park. The Parkway is managed by the National Park Service.
- Fort Loudoun Dam Reservation is located by the canal connecting Tellico Lake with Fort Loudoun Lake. Boat launching facilities are an example of the recreational benefits of TVA lakes. The Reservation is managed by TVA.
- Fort Loudoun State Historic Area is a 1,200-acre interpretive site that is the location of one of the earliest British fortifications on the Western frontier (built 1756). The Historic Area is managed by the state of Tennessee.
- Great Smoky Mountains National Park is located in Tennessee and North Carolina. Its 800 square miles are 95% forested. The area was designated as national park in 1934, as an International Biosphere Reserve in 1976, and as a World Heritage Site in 1983. The park is managed by the National Park Service.
- Harrison Branch Recreation Area is located on Tellico Lake and features a boat ramp. The Recreation area is managed by TVA.
- Lotterdale Cove Recreation Area is a campground on Tellico Lake with a sand beach, boat ramp, and camping amenities. The recreation area is managed by TVA.
- Notchy Creek Recreation Area is a swimming area located on Tellico Lake. The Recreation Area is managed by TVA.
- Tallassee Recreation Area is located on Tellico lake and features a boat ramp. The Recreation Area is managed by TVA.
- Tellico Blockhouse, located at the confluence of Ninemile Creek and Little Tennessee River, was built in 1794 as a military fort to protect the Cherokee from continued advances in the valley by settlers. The site is managed by the state of Tennessee.
- Toqua Recreation Area is a camping and day use area on Tellico Lake with a fishing pier and boat ramp. The recreation area is managed by TVA.

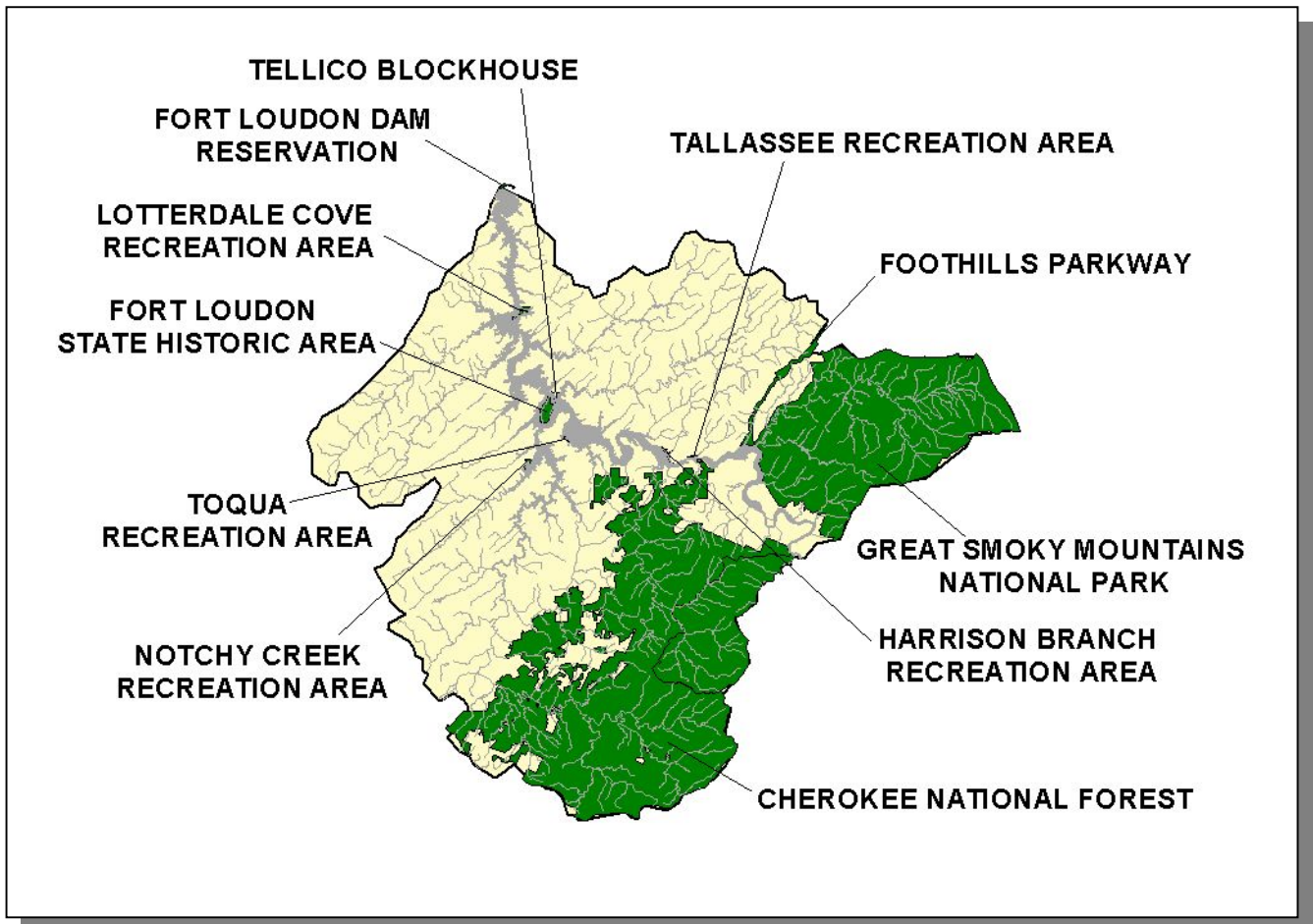


Figure 2-12. Locations of State- and Federally-Managed Lands in the Tennessee Portion of the Little Tennessee River Watershed.

2.7.D. Wildlife Management Area. The Tennessee Wildlife Resources Agency manages three wildlife management areas in the Tennessee Portion of the Little Tennessee River Watershed.

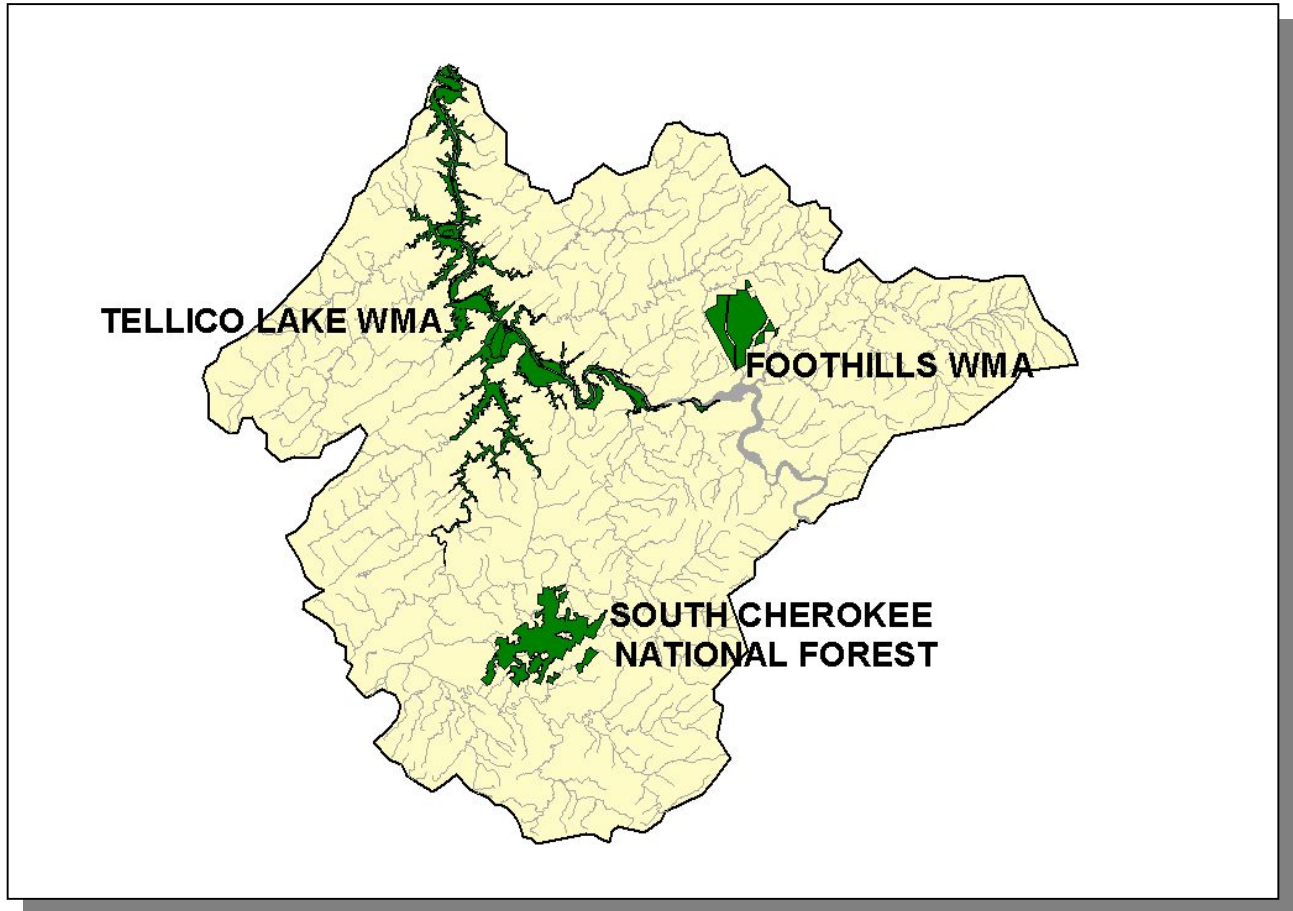


Figure 2-13. TWRA Manages Wildlife Management Areas in the Tennessee Portion of the Little Tennessee River Watershed.

2.8. Tennessee Rivers Assessment Project. The Tennessee Rivers Assessment is part of a national program operating under the guidance of the National Park Service's Rivers and Trails Conservation Assistance Program. The Assessment is an inventory of river resources, and should not be confused with "Assessment" as defined by the Environmental Protection Agency. A more complete description can be found in the Tennessee Rivers Assessment Summary Report, which is available from the Department of Environment and Conservation and on the web at:

<http://www.state.tn.us/environment/wpc/publications/riv/>

STREAM	NSQ	RB	RF	STREAM	NSQ	RB	RF
Abrams Creek	1			Little Ninemile Creek	3		
Baker Creek	3			Mill Creek	1		
Bald River	1	2	1	Mulberry Creek	1	2	
Ballplay Creek	3			Nickles Branch Cane Creek	3		
Bat Creek	3			Ninemile Creek	4		2
Big Creek	2			North Fork Citico Creek	1		
Cane Creek	3		2	North Fork Notchy Creek	3		
Centencry Creek	4			North River Meadow Branch Tellico Creek	1	2	1
Citico Creek	1	2	1	Notchy Creek	3		
Craighead Creek	2			Panther Creek	1		
Double Camp Creek	2			Rabbit Creek	1		
Flats Creek	2			Sinkhole Creek	3		
Forge Creek	1			Sixmile Creek (Wildcat Creek)	2		
Fork Creek	3	3		Sixmile Creek (Ninemile Creek)	3		
Fourmile Creek	4			South Fork Citico Creek	1		
Island Creek	4			Tellico River	1	1,2	1
Laurel Creek	3			Wildcat Creek	1,3		2

Table 2-6. Stream Scoring from the Tennessee Rivers Assessment Project in the Little Tennessee River Watershed.

Categories: NSQ, Natural and Scenic Qualities
RB, Recreational Boating
RF, Recreational Fishing

Scores: 1. Statewide or greater Significance; Excellent Fishery
2. Regional Significance; Good Fishery
3. Local Significance; Fair Fishery
4. Not a significant Resource; Not Assessed